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DUSTRY STAFFING PATTERNS
'HE MINING AND CONSTRUCTION INDUSTRY IN MONTANA

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MONTANA OCCUPATIONAL EMPLOYMENT STATISTICS

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DEPARTMENT OF LABOR AND INDUSTRY
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MONTANA OCCUPATIONAL EMPLOYMENT STATISTICS

INDUSTRY STAFFING PATTERNS
FOR THE CONSTRUCTION AND MINING INDUSTRY

3RD QUARTER 1978

STATE OF MONTANA

THOMAS L. JUDGE, GOVERNOR

PREPARED BY
RESEARCH AND ANALYSIS SECTION
EMPLOYMENT SECURITY DIVISION
DEPARTMENT OF LABOR AND INDUSTRY
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INTRODUCTION

The Occupational Employment Statistics (OES) Program is a part of Montana's Employment Security Division in comjunction with the Governor's Manpower Training Council and the Superintendent of Public Instruction - Vocational Education. The OES Program furnishes current estimates of industry staffing patterns by occupation through periodic surveys of the nonfarm wage and salary sector of the economy.

The OES Program is designed to (1) provide accurate profiles of occupational resources by industry and trends in the number of workers employed by occupation, (2) aid in projections of future manpower requirements by industry and occupation, and (3) identify emerging and disappearing occupations. This information will facilitate in the development of educational and training programs and will also provide valuable information for employment counselors and manpower planners. This report represents occupational data for Montana's Mining and Construction Industries taken during the survey period of August 12, 1978. Based on OES statistical procedures a sample of employers were asked to complete a standardized form via mail survey listing the number of workers in various occupations. Data is tabulated, analyzed then generated to show the occupational profile of selected industry groups so that individual firms will be able to compare their occupational staffing patterns to that of the industry of which they are a part of.

OCCUPATIONAL STAFFING PATTERNS

FOR THE MINING INDUSTRY

SIC (10-14)

METAL MINING

COAL MINING

NON-METALLIC MINING AND QUARRYING

CRUDE PETROLEUM AND NATURAL GAS EXTRACTION

TABLE 1

CROSS INDUSTRY STAFFING PATTERNS BY MAJOR OCCUPATIONAL GROUP IN THE MINING INDUSTRY

MAJOR OCCUPATIONAL GROUP	SIC 10	SIC 12 & 14	SIC 13	TOTAL
Managers & Officers	20	90	270	380
Professional Occupations	170	40	290	500
Technical Occupations	30	*	60	90
Service Occupations	40	40	40	120
Maintenance, Construction, Repair, Material Handling, and Power Plant Occupations	2180	1650	2340	6170
Clerical Occupations	70	70	250	390
Sales Occupations	*	*	*	*
TOTAL ALL OCCUPATIONS	2500[1/]	1890	3240	7660

1/ Occupational total are rounded and may not add to the total.

* *Employment is less than 10 people*

SIC 10

THE METAL MINING INDUSTRY

This major group includes establishments primarily engaged in mining, developing mines, or exploring for metallic minerals (ores). These ores are valued chiefly for the metals contained, to be recovered for use as such or as constituents of alloys, chemicals, pigments, etc. This major group also includes all ore dressing and benificiating operations, whether performed at mills operating in conjunction with the mines served or at mills, such as custom mills, operated separately. These include mills which crush, grind, wash, dry, sinter, or leach ore, or perform gravity separation or flotation operations.

TABLE 2

ESTIMATED EMPLOYMENT BY MAJOR OCCUPATIONS
IN THE METAL MINING INDUSTRY

(SIC 10)

OCCUPATIONAL TITLE	ESTIMATED EMPLOYMENT	PERCENT OF TOTAL
TOTAL ALL OCCUPATIONS	2500 1/	100.0
MANAGERS AND OFFICERS	20	.7
PROFESSIONAL OCCUPATIONS	170	6.7
TECHNICAL OCCUPATIONS	30	1.1
SERVICE OCCUPATIONS	40	1.6
MAINTENANCE, CONSTRUCTION, REPAIR, MATERIAL HANDLING, AND POWER PLANT OCCUPATIONS	2180	86.9
CLERICAL OCCUPATIONS	70	3.0
SALES OCCUPATIONS	*	.0

1/ Occupational totals are rounded and may not add to the total.

** Employment is less than 10 people.*

TABLE 3

ESTIMATED EMPLOYMENT IN MAJOR SPECIFIC OCCUPATIONS

IN THE METAL MINING INDUSTRY

(SIC 10)

OCCUPATIONAL TITLE	ESTIMATED EMPLOYMENT	PERCENT OF TOTAL
TRUCK DRIVER	348	13.9
MECHANIC AUTOMOTIVE	295	11.8
FOREMAN MAINTENANCE	285	11.4
HEAVY EQUIPMENT OPERATOR	183	7.3
ALL OTHER LABORERS	171	6.8
ELECTRICIAN	159	6.3
WELDERS & FLAMECUTTERS	135	5.4
OILER	117	4.7
DRILLER MACHINE	77	3.1
ALL OTHER OPERATIVES	56	2.2
TOTAL	1826	72.9
TOTAL ALL OCCUPATIONS	2504	100.0

TABLE 4

ESTIMATED EMPLOYMENT OF SELECTED OCCUPATIONS
IN THE METAL MINING INDUSTRY

(SIC 10)

OCCUPATIONAL TITLE	OES CODE	ESTIMATED EMPLOYMENT	PERCENT DISTRIBUTION
TOTAL ALL OCCUPATIONS		2504	100.00
MANAGERS AND OFFICERS	10000	17	.68
PROFESSIONAL OCCUPATIONS		169	6.75
Civil Engineer	21004	3	.11
Industrial Engineer	21006	4	.16
Mechanical Engineer	21008	15	.60
Metallurgist & Metallurgical Engineer	21009	3	.11
Mining Engineer	21010	24	.96
Safety Engineer	21012	15	.60
All Other Engineers	21900	12	.48
Chemists	22201	13	.52
Geologists & Geophysicists	22202	5	.20
All Other Physical Scientists	22299	25	1.00
Purchasing Agent	25300	9	.36
Accountants & Auditors	25401	28	1.11
Personnel & Labor Relations Specialists	25465	13	.52
TECHNICAL OCCUPATIONS		27	1.08
Draftsman	32003	8	.32
Surveyor	32008	8	.32
All Other Engineering Technicians	32900	11	.44
SERVICE OCCUPATIONS		41	1.64
Janitors, Porters, & Cleaners	41000	18	.72
Guards, Watchmen, & Doorkeepers	42000	23	.92
MAINTENANCE, CONSTRUCTION, REPAIR, MATERIAL HANDLING, & POWER PLANT OCCUPATIONS		2176	86.90
Mechanic, Automotive	51008	295	11.78
Truck Driver	54000	348	13.90
Blaster	55A21	17	.68
Bratticeman	55A30	3	.11
Carpenter	55A47	27	1.08

METAL MINING INDUSTRY
(CONT.)

OCCUPATIONAL TITLE	OES CODE	ESTIMATED EMPLOYMENT	PERCENT DISTRIBUTION
MAINTENANCE, ETC., (CONT.)			
Cranemen, Derrickmen, & Hoistmen	55A82	45	1.80
Driller, Hand	55B03	4	.16
Driller, Machine	55B04	77	3.10
Dump Operator	55B07	16	.64
Electrician	55B12	159	6.35
Foreman Maintenance	55B29	285	11.38
Heavy Equipment Operator	55B52	183	7.31
Lampman	55B68	1	.03
Loading Machine Operator	55B78	4	.16
Machinist	55B84	47	1.88
General Maintenance Man	55B86	6	.24
Helper, Trade	55B87	5	.20
Oiler	55C06	117	4.67
Painter	55C12	11	.44
Panel Operator &/Or Grinder	55C20	17	.68
Plumber &/Or Pipefitter	55C30	48	1.92
Stationary Boiler Firerer	55C90	5	.20
Stationary Engineer	55C91	20	.80
Tipple Operator	55D21	4	.16
Welders & Flamecutters	55D46	135	5.40
Chainman, Rodman, & Layman	55D88	8	.32
Belt Repairman	55D98	4	.16
Mill &/Or Grinder Operator	55S98	49	1.96
All Other Skilled Craftsman	59001	9	.36
All Other Operatives	59002	56	2.24
All Other Laborers	59003	171	6.83
CLERICAL OCCUPATIONS		74	2.96
Accounting Clerk	61301	12	.48
General Clerk	61333	13	.52
Payroll &/Or Timekeeper	61351	4	.16
Personnel Clerk	61352	4	.16
Secretary	61368	20	.80
Switchboard Operator	61376	8	.32
Clerical Supervisor	61396	9	.36
All Other Office Clerical	61900	4	.16

SIC 12

THE COAL MINING INDUSTRY

This major group includes establishments primarily engaged in producing bituminous coal or lignite. Included are mining operations, preparation plants, and cleaning plants, whether or not such plants are operated in conjunction with the mines served.

SIC 14

MINING AND QUARRYING OF NONMETALLIC MINERALS, EXCEPT FUELS

This major group includes establishments primarily engaged in mining or quarrying, developing mines, or exploring for nonmetallic minerals, except fuels. Also included are certain well and brine operations, and pr mary preparation plants, such as those engaged in crushing, grinding, washing, or other concentration.

TABLE 5

ESTIMATED EMPLOYMENT BY MAJOR OCCUPATIONS
IN THE COAL MINING AND QUARRYING INDUSTRY

(SIC 12 & 14)

OCCUPATIONAL TITLE	ESTIAMTED EMPLOYMENT	PERCENT OF TOTAL
TOTAL ALL OCCUPATIONS	1890 1/	*100.0*
MANAGERS AND OFFICERS	90	*4.8*
PROFESSIONAL OCCUPATIONS	40	*2.1*
TECHNICAL OCCUPATIONS	*	*
SERVICE OCCUPATIONS	40	*2.1*
MAINTENANCE, CONSTRUCTION, REPAIR, MATERIAL HANDLING, AND POWER PLANT OCCUPATIONS	1650	*87.3*
CLERICAL OCCUPATIONS	70	*3.7*
SALES OCCUPATIONS	*	*

1/ Occupational totals are rounded and may not add to the total.

* *Employment is less than 10 people.*

TABLE 6

ESTIMATED EMPLOYMENT IN MAJOR SPECIFIC OCCUPATIONS

IN THE COAL MINING AND QUARRYING INDUSTRY

(SIC 12 & 14)

OCCUPATIONAL TITLE	ESTIMATED EMPLOYMENT	PERCENT OF TOTAL
HEAVY EQUIPMENT OPERATOR	565	*29.9*
TRUCK DRIVER	191	*10.1*
GENERAL MAINTENANCE MAN	120	*6.3*
MANAGERS & OFFICERS	87	*4.6*
DRILLER, HAND	85	*4.5*
OILER	84	*4.4*
ALL OTHER OPERATIVES	84	*4.4*
FOREMAN MAINTENANCE	77	*4.1*
ELECTRICIAN	73	*3.9*
WELDERS & FLAMECUTTERS	65	*3.4*
TOTAL	1431	*75.6*
TOTAL ALL OCCUPATIONS	1892	*100.0*

TABLE 7

ESTIMATED EMPLOYMENT OF SELECTED OCCUPATIONS IN THE COAL MINING INDUSTRY (BITUMINOUS AND LIGNITE)

(SIC 12 & 14)

OCCUPATIONAL TITLE	OES CODE	ESTIMATED EMPLOYMENT	PERCENT DISTRIBUTION	PERCENT OF ESTABLISHMENTS REPORTING THE OCCUPATION
TOTAL ALL OCCUPATIONS		1892		
MANAGERS AND OFFICERS	10000	87	*4.60*	*25*
PROFESSIONAL OCCUPATIONS		40		
TECHNICAL OCCUPATIONS		3		
SERVICE OCCUPATIONS		40		
Janitors, Porters, & Cleaners	41000	40	*2.11*	*25*
MAINTENANCE, CONSTRUCTION, REPAIR, MATERIAL HANDLING, AND POWER PLANT OCCUPATIONS		1647		
Truck Driver	54000	191	*10.10*	*25*
Blaster	55A21	55	*2.91*	*25*
Driller, Machine	55B04	38	*2.01*	*13*
Electrician	55B12	73	*3.86*	*25*
Foreman Maintenance	55B29	77	*4.07*	*13*
Heavy Equipment Operator	55B52	565	*29.86*	*25*
Maintenance Man, General	55B86	120	*6.34*	*13*
Oiler	55C06	84	*4.44*	*25*
Welders & Flamecutter	55D46	65	*3.44*	*13*
All Other Operatives	59002	84	*4.44*	*13*
All Other Laborers	59003	60	*3.17*	*NA*
Driller, Hand	55B03	85	*4.49*	*13*
CLERICAL OCCUPATIONS		75		

OCCUPATIONS PRESENT IN THE SURVEY
BUT NOT PUBLISHABLE BECAUSE OF RELATIVE ERRORS
GREATER THAN FIFTY PERCENT OR LESS THAN 30 PEOPLE

Mechanical Engineer
Purchasing Agent
Mine Machinery Mechanic
Carpenter
File Clerk
Secretary
Stock Clerk, Storeroom, & Warehouse
All Other Plant Clerical
Mining Engineer
Personnel & Labor Relations
Machinist
General Clerk
Typist
Accounting Clerk
Cashier
Accountants & Auditors
All Other Engineers
Mechanic Automotive
All Other Mechanics
Tipple Operator
Payroll &/or Timekeeper
Clerical Supervisor
Switchboard Operator
Personnel Clerk
Geologists & Geophysicists

OCCUPATIONS PRESENT IN THE SURVEY
BUT NOT PUBLISHABLE BECAUSE OF RELATIVE ERRORS
GREATER THAN FIFTY PERCENT OR LESS THAN 30 PEOPLE
(CONT.)

Surveyor
Helper, Trade
Mill &/or Grinder Operator
Plumber &/or Pipefitter
Deliverymen & Routemen
Shaker Tender
Craneman/Derrickman
Stationary Engineer
Loading Machine Operator
Motorman
Panel Operator &/or Grinder

SIC 13

THE OIL AND GAS EXTRACTION INDUSTRY

This major group includes establishments primarily engaged in: (1) producing crude petroleum and natural gas, (2) recovering oil from oil sands and oil shale, and (3) producing natural gasoline and cycle condensate. Types of activities included are exploration, drilling, oil and gas well operation and maintenance, the operation of natural gasoline and cycle plants, and the mining and extraction of oil from oil sands and oil shale. This major group also includes such basic activities as emulsion breaking and desilting of crude petroleum in the preparation of oil and gas customarily done at the field site.

TABLE 8

ESTIMATED EMPLOYMENT BY MAJOR OCCUPATIONS
IN THE OIL AND GAS INDUSTRY

(SIC 13)

OCCUPATIONAL TITLE	ESTIMATED EMPLOYMENT	PERCENT OF TOTAL
TOTAL ALL OCCUPATIONS	3240 1/	100.0
MANAGERS AND OFFICERS	270	8.3
PROFESSIONAL OCCUPATIONS	290	9.0
TECHNICAL OCCUPATIONS	60	1.9
SERVICE OCCUPATIONS	40	1.2
MAINTENANCE, CONSTRUCTION, REPAIR, MATERIAL HANDLING, AND POWER PLANT OCCUPATIONS	2340	72.2
CLERICAL OCCUPATIONS	250	7.7
SALES OCCUPATIONS	*	.1

1/ *Occupational totals are rounded and may not add to the total.*

* *Employment is less than 10 people.*

TABLE 9

ESTIMATED EMPLOYMENT IN MAJOR SPECIFIC OCCUPATIONS

IN THE OIL AND GAS INDUSTRY

(SIC 13)

OCCUPATIONAL TITLE	ESTIMATED EMPLOYMENT	PERCENT OF TOTAL
ROUSTABOUT	475	*14.7*
ROTARY DRILL HELPER	465	*14.4*
MANAGERS & OFFICERS	279	*8.6*
ALL OTHER LABORERS	249	*7.7*
OIL PUMPER	191	*5.9*
GEOLOGISTS & GEOPHYSICISTS	159	*4.9*
ROTARY DRILL OPERATOR	146	*4.5*
DERRICKMAN, PETROLEUM	135	*4.2*
SECRETARY	121	*3.7*
FOREMAN MAINTENANCE	74	*2.3*
TOTAL	2294	*70.9*
TOTAL ALL OCCUPATIONS	3235	*100.0*

TABLE 10

ESTIMATED EMPLOYMENT IN SELECTED OCCUPATIONS IN THE CRUDE PETROLEUM AND NATURAL GAS EXTRACTION INDUSTRY

(SIC 13)

OCCUPATIONAL TITLE	OES CODE	ESTIMATED EMPLOYMENT	RELATIVE ERROR %	PERCENT DISTRIBUTION	PERCENT OF ESTABLISHMENTS REPORTING THE OCCUPATION
TOTAL ALL OCCUPATIONS		3235			
MANAGERS AND OFFICERS	10000	279	21.11	8.62	80
PROFESSIONAL OCCUPATIONS		296			
Petroleum Engineer	21011	37	NA	1.14	14
Geologists & Geophysicists	22202	159	NA	4.92	16
Purchasing Agent	25300	42	NA	1.30	5
Accountants & Auditors	25401	31	NA	.96	16
TECHNICAL OCCUPATIONS		61			
SERVICE OCCUPATIONS		44			
MAINTENANCE, CONSTRUCTION, REPAIR, MATERIAL HANDLING, AND POWER PLANT OCCUPATIONS		2346			
Mechanic Automotive	51008	55	30.17	1.70	16
Truck Driver	54000	51	37.35	1.58	20
Derrickman, Petroleum	55A88	135	49.24	4.17	11
Foreman Maintenance	55B29	74	NA	2.29	25
Heavy Equipment Operator	55B52	55	41.22	1.70	9
General Maintenance Man	55B86	57	NA	1.76	9
Oil Pumper	55C05	191	NA	5.90	16
Pumper, Head	55C59	33	NA	1.02	11
Rotary Drill Operator	55C59	146	28.13	4.51	23
Rotary Drill Helper	55C60	465	43.57	14.37	25
Roustabout	55C61	475	33.02	14.68	36
Service Unit Oil Operator	55C69	66	NA	2.04	16
Shooter	55C82	51	NA	1.58	9
Well Puller	55D47	73	NA	2.26	5
All Other Operatives	59002	42	NA	1.30	5
All Other Laborers	59003	249	NA	7.70	20
CLERICAL OCCUPATIONS		259			
General Clerk	61333	41	48.37	1.27	23
Secretary	61368	121	29.07	3.74	34

OCCUPATIONS PRESENT IN THE SURVEY
BUT NOT PUBLISHABLE BECAUSE OF RELATIVE ERRORS
GREATER THAN FIFTY PERCENT OR LESS THAN 30 PEOPLE

(SIC 13)

Civil Engineer
Surveyor
Foreman Nonworking, Supervisor
Helper, Trade
All Other Skilled Craftsmen
Payroll &/or Timekeeper
Clerical Supervisor
Leaseman
Chainman, Rodman &/or Layman
Safety Engineer
Airplane Pilot
Mechanic Maintenance
Cable Driller
Rig Builder
Bookkeeping & Billing
Accounting Clerk
Receptionist
Stock Clerk, Storeroom, Warehouse
Machinist
Obser Elec/Obser Gra
Janitors, Porter, & Cleaners
Clean-out Driller
Welders & Flamecutter
Keypunch Operator
Bookkeeper Hand
Typist
Salesman
Draftsman

TABLE 11

TOTAL WAGE AND SALARY EMPLOYMENT IN THE MINING INDUSTRY IN MONTANA

YEAR	SIC 10	SIC 12 & 14	SIC 13
1972	3700[1/]	1000	1600
1973	3800	1100	1600
1974	4000	1300	1800
1975	3100	1500	1800
1976	2400	1500	2000
1977	2000	1500	2600
1978	2100	2000	2800

1/ All data are rounded to the nearest hundred.

TABLE 12

TOTAL MINING EMPLOYMENT
UNITED STATES

1960 - 1978

Year	Employment
1960	712,000
1961	672,000
1962	650,000
1963	635,000
1964	634,000
1965	632,000
1966	627,000
1967	613,000
1968	606,000
1969	619,000
1970	623,000
1971	609,000
1972	628,000
1973	642,000
1974	697,000
1975	752,000
1976	779,000
1977	813,000
1978	851,000

SOURCE: Employment and Earnings
October, 1979
U. S. Department of Labor
Bureau of Labor Statistics
Vol. 26, No. 10

TABLE 13

MONTANA HOURS AND EARNINGS
FOR THE MINING INDUSTRY

1970 - 1978

Year	Average Weekly Earnings		Average Weekly Hours		Average Hourly Earnings	
	Mining	Metal Mining	Mining	Metal Mining	Mining	Metal Mining
1970	158.59	159.39	41.3	41.4	3.84	3.85
1971	169.81	170.96	43.1	43.5	3.94	3.93
1972	187.65	190.85	41.7	41.4	4.50	4.61
1973	198.58	198.19	41.2	40.2	4.82	4.93
1974	237.73	239.44	42.3	41.0	5.62	5.84
1975	272.82	271.42	43.1	41.0	6.33	6.62
1976	304.56	301.07	43.2	41.7	7.05	7.22
1977	345.40	359.72	42.8	40.6	8.07	8.86
1978	387.56	411.98	43.4	39.5	8.93	10.43

TABLE 14

NATIONAL HOURS AND EARNINGS
FOR THE MINING INDUSTRY

1970 - 1978

Year	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
1970	164.40	42.7	3.85
1971	172.14	42.4	4.06
1972	189.14	42.6	4.44
1973	201.40	42.4	4.75
1974	219.14	41.9	5.23
1975	249.31	41.9	5.95
1976	273.90	42.4	6.46
1977	301.20	43.4	6.94
1978	332.11	43.3	7.67

SOURCE: Employment and Earnings
October 1979
U. S. Department of Labor
Bureau of Labor Statistics
Vol. 26, No. 10

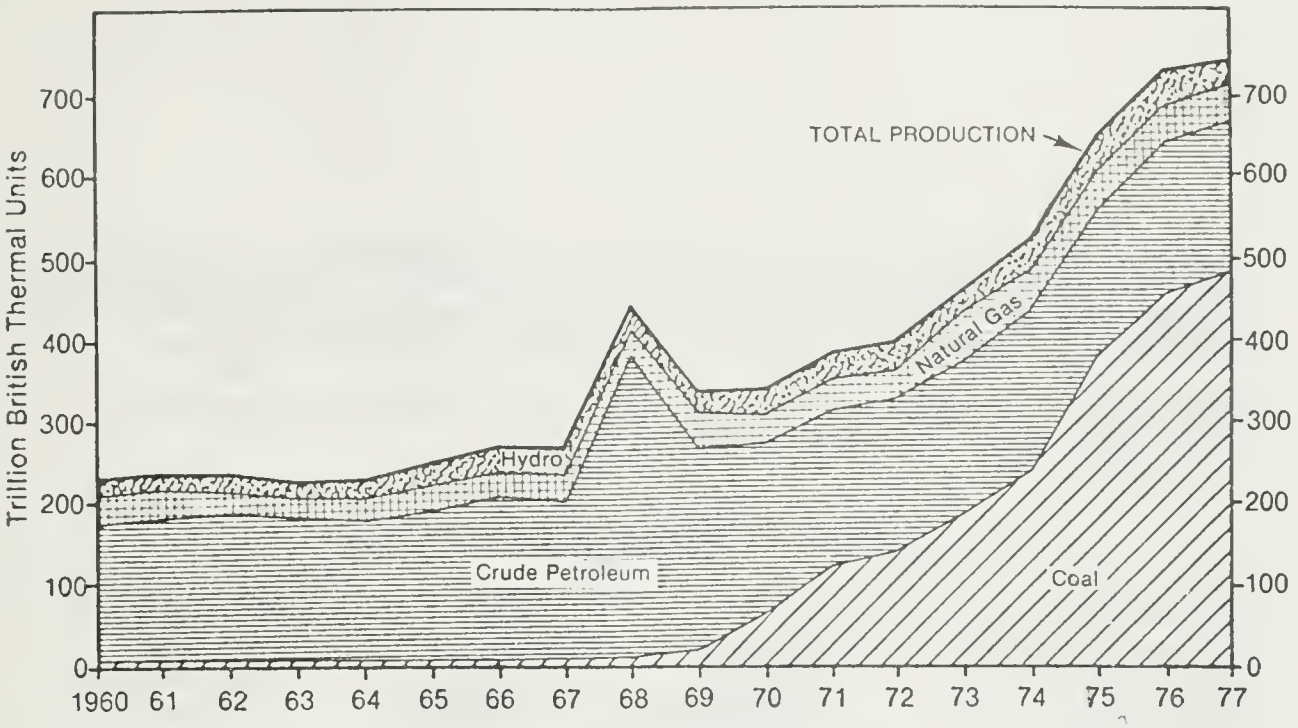

FIGURE II-B PRODUCTION OF ENERGY IN MONTANA, BY TYPE OF FUEL

Source Montana Energy Office, *Montana Historical Energy Statistics*, 1978

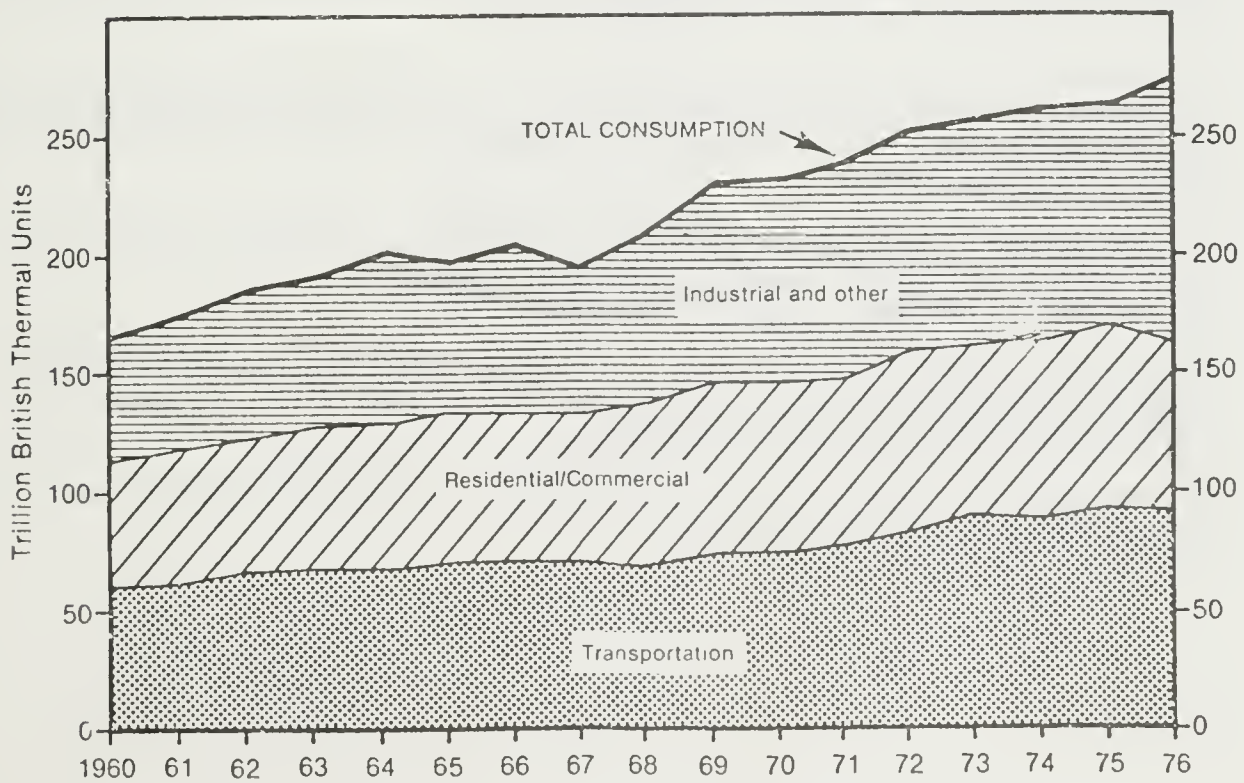

FIGURE II-C CONSUMPTION OF ENERGY IN MONTANA, BY SECTOR

Source Montana Energy Office, *Montana Historical Energy Statistics*, 1977

According to annual statistics published by the American Gas Association, Montana's total identified subbituminous coal resource is an estimated 176.8 billion tons and the estimated lignite resource is 112.5 billion tons, or 36 percent and 24 percent, respectively, of known United States reserves.

1976 and 1977 production volumes for the various fuels and hydroelectric energy generation are listed in the table below:

Comparative Montana Energy Production

Energy Type	1976	1977	Units of Measure
Coal and Lignite	26,180,671	27,393,439	tons
Crude Oil	32,814	32,680	1000 barrels
Natural Gas	45,098	47,235	million ft^3
Net Hydroelectric Generation	12,406,000	8,459,754	MWH

During the 1972-1977 period, Montana's annual coal production increased nearly 350 percent, while the annual volume of natural gas, crude oil and hydroelectric production remained relatively constant.

In 1976 there were 32,814,000 barrels of crude oil produced. Imports from Canada and Wyoming accounted for about 80 percent of the 48,297,000 barrels of crude oil refined in Montana, nearly one half are exported, primarily to Washington, Idaho, Wyoming and North Dakota.

In 1976 Montana's natural gas consumption totaled 70,376 million cubic feet. Residential and commerical sector customers consumed 50 percent of the total and industrial customers used the remainder.

Montana presently has slightly over 3,056 MW of installed electric generating capacity, of which 1,931 MW is hydropower, 939 MW coal-fired, 69 MW oil/gas, approximately 30 MW has and 25 MW diesel.

Following are two graphs showing the production of energy in Montana and also the consumption of energy in Montana.

OCCUPATIONAL STAFFING PATTERNS

FOR THE CONSTRUCTION INDUSTRY

SIC (15-17)

BUILDING CONSTRUCTION

GENERAL CONTRACTORS

SPECIAL TRADE CONTRACTORS

TABLE 15

CROSS INDUSTRY STAFFING PATTERNS BY MAJOR
OCCUPATIONAL GROUP IN THE CONSTRUCTION INDUSTRY

MAJOR OCCUPATIONAL GROUP	SIC 15	SIC 16	SIC 17	TOTAL
Managers & Officers	410	380	580	1370
Professional Occupations	210	160	170	540
Technical Occupations	50	30	70	150
Service Occupations	70	10	40	120
Maintenance, Construction, Repair, Material Handling, and Power Plant Occupations	4930	4820	4480	14230
Clerical Occupations	370	280	390	1040
Sales Occupations	70	*	90	160
TOTAL ALL OCCUPATIONS	6120[1/]	5680	5820	17620

1/ Occupational totals are rounded and may not add to the total.

* *Employment is less than 10 people.*

SIC 15

BUILDING CONSTRUCTION - GENERAL CONTRACTORS AND OPERATIVE BUILDERS

This major group includes general contractors operative builders primarily engaged in the construction of residential, farm, industrial, commercial, or thor buildings. General building contractors who combine a special trade with the contracting are included in this major group.

TABLE 16

ESTIMATED EMPLOYMENT BY MAJOR OCCUPATIONS
IN THE BUILDING CONSTRUCITON INDUSTRY

(SIC 15)

OCCUPATIONAL TITLE	ESTIMATED EMPLOYMENT	PERCENT OF TOTAL
TOTAL ALL OCCUPAITONS	6120	*100.0*
MANAGERS AND OFFICERS	410	*6.7*
PROFESSIONAL OCCUPATIONS	210	*3.4*
TECHNICAL OCCUPATIONS	50	*.8*
SERVICE OCCUPATIONS	70	*1.1*
MAINTENANCE, CONSTRUCTION, REPAIR, MATERIAL HANDLING, AND POWER PLANT OCCUPATIONS	4930	*80.6*
CLERICAL OCCUPATIONS	370	*6.0*
SALES OCCUPATIONS	70	*1.1*

1/ Occupational totals are rounded and may not add to the total.

** Employment is less than 10 people.*

TABLE 17

ESTIMATED EMPLOYMENT IN MAJOR SPECIFIC OCCUPATIONS

IN THE BUILDING CONSTRUCTION INDUSTRY

(SIC 15)

OCCUPATIONAL TITLE	ESTIMATED EMPLOYMENT	PERCENT OF TOTAL
CARPENTER	2603	42.6
CARPENTER HELPER	522	9.0
ALL OTHER LABORERS	433	7.0
MANAGERS & OFFICERS	406	6.6
METAL FABRICATOR	278	4.5
REINFORCING IRON WORKER	166	2.7
BOOKEEPER HAND	135	2.2
GENERAL CLERK	130	2.1
COST ESTIMATOR	129	2.1
FOREMAN MAINTENANCE	112	1.8
TOTAL	4914	80.4
TOTAL ALL OCCUPATIONS	6115	100.0

TABLE 18

ESTIMATED EMPLOYMENT IN SELECTED OCCUPATIONS IN THE GENERAL BUILDING CONSTRUCTION INDUSTRY

(SIC 15)

OCCUPATIONAL TITLE	OES CODE	ESTIMATED EMPLOYMENT	RELATIVE ERROR %	PERCENT DISTRIBUTION	PERCENT OF ESTABLISHMENTS REPORTING THE OCCUPATION
TOTAL ALL OCCUPATIONS		6115			
MANAGERS & OFFICERS	10000	406	17.19	6.64	73
PROFESSIONAL OCCUPATIONS		206			
Civil Engineer	21004	31	40.46	.51	6
Accountants & Auditors	25401	37	43.72	.61	10
Cost Estimator	25427	129	19.07	2.11	39
TECHNICAL OCCUPATIONS		52			
Draftsman	32003	52	33.13	.85	11
SERVICE OCCUPATIONS		71			
Janitors, Porter, & Cleaners	41000	70	47.51	1.14	10
MAINTENANCE, CONSTRUCTION, REPAIR, MATERIAL HANDLING, AND POWER PLANT OCCUPATIONS		4933			
Truck Driver	54000	88	44.87	1.44	8
Carpenter	55A47	2603	10.85	42.57	82
Cement Mason	55A51	96	44.37	1.57	11
Heavy Equipment Operator	55B52	109	34.56	1.78	26
Painter	55C12	37	49.16	.61	6
Reinforcing Iron Worker	55C52	166	38.01	2.71	15
Sheet Metal Worker	55C81	4	45.94	.01	2
Refrigeration Mechanic	51052	84	NA	1.37	3
Dry-Wall Applicator	55B05	89	NA	1.46	5
Foreman Maintenance	55B29	112	NA	1.83	18
Metal Fabricator	55B91	278	NA	4.55	8
Structural Steel Worker	55C96	34	NA	.56	2
Taper	55D07	100	NA	1.64	6
Carpenter Helper	56003	407	26.94	6.66	35
Cement Mason Helper	56004	36	NA	.59	3
All Other Laborers	59003	433	NA	7.08	29

GENERAL BUILDING CONSTRUCTION INDUSTRY
(CONT.)

OCCUPATIONAL TITLE	OES CODE	ESTIMATED EMPLOYMENT	RELATIVE ERROR %	PERCENT DISTRIBUTION	PERCENT OF ESTABLISHMENTS REPORTING THE OCCUPATION
CLERICAL OCCUPATIONS		366			
Bookkeeper Hand	61307	135	*20.99*	*2.21*	*47*
General Clerk	61333	130	*22.00*	*2.13*	*37*
Secretary	61368	89	*20.01*	*1.46*	*29*
SALES OCCUPATIONS		70			
Salesman	71000	70	*42.43*	*1.14*	*11*

OCCUPATIONS PRESENT IN THE SURVEY
BUT NOT PUBLISHABLE BECAUSE OF RELATIVE ERRORS
GREATER THAN FIFTY PERCENT

Mechanical Engineer
Craneman, Derrickman
General Maintenance Man
Bricklayer Helper
Payroll &/or Timekeeper
Asbestos and Insulation
Plumber &/or Pipefitter
Purchasing Agent
Deliverymen and Routeman
Millwright
Plumber Helper
Stock Clerk, Storeroom
Warehouse
Electrician Helper
Mechanic Automotive
Electrician
Welders & Flamecutter
Accounting Clerk
Guards, Watchmen &
Doormen

SIC 16

CONSTRUCTION OTHER THAN BUILDING CONSTRUCTION - GENERAL CONTRACTORS

This major group includes general contractors engaged in heavy construction (including new work, additions, improvements, maintenance, and repair) such as highways and streets, bridges, sewers, railroads, irrigation projects, and marine construction, and miscellaneous types of construction work other than buildings. General heavy construction contractors who combine a special trade with the contracting are included in this major group.

TABLE 19

ESTIMATED EMPLOYMENT BY MAJOR OCCUPATIONS
IN THE GENERAL CONTRACTORS INDUSTRY

(SIC 16)

OCCUPATIONAL TITLE	ESTIMATED EMPLOYMENT	PERCENT OF TOTAL
TOTAL ALL OCCUPATIONS	5680 1/	100.0
MANAGERS AND OFFICERS	380	6.7
PROFESSIONAL OCCUPATIONS	160	2.9
TECHNICAL OCCUPATIONS	30	.5
SERVICE OCCUPATIONS	10	.1
MAINTENANCE, CONSTRUCTION, REPAIR, MATERIAL HANDLING, AND POWER PLANT OCCUPATIONS	4820	84.8
CLERICAL OCCUPATIONS	280	5.0
SALES OCCUPATIONS	*	.0

1/ *Occupational totals are rounded and may not add to the total.*

* *Employment is less than 10 people*

TABLE 20

ESTIMATED EMPLOYMENT IN MAJOR SPECIFIC OCCUPATIONS

IN THE GENERAL CONTRACTORS INDUSTRY

(SIC 16)

OCCUPATIONAL TITLE	ESTIMATED EMPLOYMENT	PERCENT OF TOTAL
HEAVY EQUIPMENT OPERATOR	1430	25.2
CARPENTER	570	10.0
ALL OTHER LABORERS	562	9.9
TRUCK DRIVER	485	8.5
MANAGERS & OFFICERS	383	6.7
STRUCTURAL STEEL WORKER	234	4.1
CARPENTER HELPER	154	2.7
ALL OTHER OPERATIVES	130j	2.3
MECHANIC AUTOMOTIVE	127	2.2
CEMENT MASON	126	2.2
TOTAL	4201	74.0
TOTAL ALL OCCUPATIONS	5680	100.0

TABLE 21

ESTIMATED EMPLOYMENT IN SELECTED OCCUPATIONS IN THE HEAVY & HIGHWAY CONSTRUCTION INDUSTRY

(SIC 16)

OCCUPATIONAL TITLE	OES CODE	ESTIMATED EMPLOYMENT	RELATIVE ERROR %	PERCENT DISTRIBUTION	PERCENT OF ESTABLISHMENTS REPORTING THE OCCUPATION
TOTAL ALL OCCUPATIONS		5680			
MANAGERS AND OFFICERS	10000	383	22.81	6.48	71
PROFESSIONAL OCCUPATIONS		163			
Civil Engineer	21004	44	47.24	.77	8
Accountants & Auditors	25401	51	45.85	.90	25
Cost Estimator	25427	37	31.79	.65	33
TECHNICAL OCCUPATIONS		30			
SERVICE OCCUPATIONS		6			
MAINTENANCE, CONSTRUCTION, REPAIR, MATERIAL HANDLING, AND POWER PLANT OCCUPATIONS		4817			
Mechanic Automotive	51008	127	34.25	2.24	50
Diesel Mechanic	51019	30	15.87	.53	29
Mechanic Maintenance	51043	54	8.76	.95	15
Truck Driver	54000	485	12.55	8.54	58
Air Hammer Operator	55A04	123	NA	2.17	21
Carpenter	55A47	570	21.52	10.04	38
Cement Mason	55A51	126	32.47	2.22	25
Craneman/Derrickman	55A82	66	NA	1.16	33
Deliverymen and Routemen	55A87	43	25.89	.76	4
Foreman Maintenance	55B29	53	NA	.93	17
Form Tamper Op or Ta	55B32	45	NA	.79	13
Heavy Equipment Operator	55B52	1430	18.98	25.18	75
Oiler	55C06	86	45.55	1.51	42
Lineman	55B73	49	NA	.86	4
Plumber &/or Pipefitter	55C30	38	NA	.67	4
Pipe Layer	55C23	62	NA	1.09	13
Structural Steel Worker	55C96	234	45.83	4.12	8
Welders & Flamecutter	55D46	54	NA	.95	25
Carpenter Helper	56003	154	24.20	2.71	8
Electrician Helper	56005	46	NA	.81	4
All Other Skilled Craftsman	59001	46	NA	.81	8
All Other Operative	59002	130	NA	2.29	17
All Other Laborers	59003	562	NA	9.89	54

HEAVY & HIGHWAY CONSTRUCTION INDUSTRY
(CONT.)

OCCUPATIONAL TITLE	OES CODE	ESTIMATED EMPLOYMENT	RELATIVE ERROR %	PERCENT DISTRIBUTION	PERCENT OF ESTABLISHMENTS REPORTING THE OCCUPATION
CLERICAL OCCUPATIONS		283			
Bookkeeper Hand	61307	97	*41.97*	*1.71*	*33*
General Clerk	51333	99	*29.79*	*1.74*	*25*
Payroll &/or Timekeeper	61351	34	*38.76*	*.60*	*46*

OCCUPATIONS PRESENT IN THE SURVEY
BUT NOT PUBLISHABLE BECAUSE OF RELATIVE ERRORS
GREATER THAN FIFTY PERCENT OR LESS THAN 30 PERCENT

Mechanical Engineer
Purchasing Agent
Draftsman
Engineering Equipment
Blaster Construction
Fine Grader Man
Industrial Truck Operator
Painter
Structural Steel Lay
Asphalt-Plant Operator
Accounting Clerk
Personnel Clerk
Secretary
Shipping and Receiving
Machinist
Fitter
Safety Engineer
Personnel & Labor Relations
Surveyor
Asphalt-Heater Man
Concrete-Mixer Operator
Form Setter Metal Rd
Maintenance Man General
Reinforcing Iron Worker
Chainman, Rodman &/or Layman
Asphalt Raker
File Clerk
Procurement Clerk
Typist
Stock Clerk, Storeroom, & Warehouse
Electrician
All Other Engineers
All Other Professions
Janitors, Porter, & Cleaners
Fence Erector
Hook and Chainmen
Metal Fabricator
Sewer Bottom Man
Asphalt-Plant Drier
Stenographer
Order Clerk
Receptionist
Production Clerk
Computer Programer
Cement Mason Helper

SIC 17

CONSTRUCTION - SPECIAL TRADE CONTRACTORS

This major group includes contractors who undertake specialized activities such as plumbing, painting, plastering, carpentering, etc. Also included are establishments primarily engaged in miscellaneous specialized construction activities such as industrial machinery and equipment installation, grave excavation, gas leakage detection and water well drilling. Special trade contractors may work on subcontract from the general contractor, performing only part of the work covered by the general contract, or they may work directly for the owner. Special trade contractors for the most part perform their work at the site of construction, although they also may have shops where they perform work incidental to the job site.

TABLE 22

ESTIMATED EMPLOYMENT BY MAJOR OCCUPATIONS
IN THE SPECIAL TRADE CONTRACTORS INDUSTRY

(SIC 17)

OCCUPATIONAL TITLE	ESTIMATED EMPLOYMENT	PERCENT OF TOTAL
TOTAL ALL OCCUPATIONS	5820 1/	*100.0*
MANAGERS AND OFFICERS	580	*10.1*
PROFESSIONAL OCCUPATIONS	170	*2.9*
TECHNICAL OCCUPATIONS	70	*1.2*
SERVICE OCCUPATIONS	40	*.7*
MAINTENANCE, CONSTRUCTION, REPAIR, MATERIAL HANDLING, AND POWER PLANT OCCUPATIONS	4480	*77.0*
CLERICAL OCCUPATIONS	390	*6.8*
SALES OCCUPATIONS	90	*1.5*

1/ Occupational totals are rounded and may not add to the total.

TABLE 23

ESTIMATED EMPLOYMENT IN MAJOR SPECIFIC OCCUPATIONS

IN THE SPECIAL TRADE CONTRACTORS INDUSTRY

(SIC 17)

OCCUPATIONAL TITLE	ESTIMATED EMPLOYMENT	PERCENT OF TOTAL
ELECTRICIAN	872	*15.0*
PLUMBER &/OR PIPEFIT	621	*10.7*
MANAGERS & OFFICERS	585	*10.1*
HEAVY EQUIPMENT OPERATOR	340	*5.8*
CEMENT MASON	260	*4.5*
SHEET METAL WORKER	258	*4.4*
BRICKLAYER	196	*3.4*
ROOFER	182	*3.1*
PAINTER	178	*3.1*
GENERAL CLERK	156	*2.7*
TOTAL	3648	*62.7*
TOTAL ALL OCCUPATIONS	5818	*100.0*

TABLE 24

ESTIMATED EMPLOYMENT IN SELECTED OCCUPATIONS IN THE SPECIAL TRADE CONTRACTOR'S INDUSTRY

(SIC 17)

OCCUPATIONAL TITLE	OES CODE	ESTIMATED EMPLOYMENT	RELATIVE ERROR %	PERCENT DISTRIBUTION	PERCENT OF ESTABLISHMENTS REPORTING THE OCCUPATION
TOTAL ALL OCCUPATIONS		5818			
MANAGERS AND OFFICERS	10000	585	22.83	10.05	69
PROFESSIONAL OCCUPATIONS		167			
Accountants & Auditors	25401	30	NA	.52	11
Cost Estimator	25427	103	37.12	1.77	26
TECNICAL OCCUPATIONS		68			
Electrical Technicians	32004	59	NA	1.01	2
SERVICE OCCUPATIONS		39			
Janitors, Porters, & Cleaners	41000	39	37.04	.67	11
MAINTENANCE, CONSTRUCTION, REPAIR, MATERIAL HANDLING, AND POWER PLANT OCCUPATIONS		4479			
Refrigeration Mechanic	51052	32	26.21	.55	7
Truck Driver	54000	73	49.86	1.25	2
Air Hammer Operator	55A04	32	35.33	.55	1
Boilermaker	55A24	152	46.46	2.61	2
Bricklayer	55A31	196	9.58	3.37	8
Carpenter	55A47	112	42.61	1.93	5
Dry-Wall Applicator	55B05	44	49.38	.76	1
Electrician	55B12	872	12.70	14.99	25
Fence Erector	55B18	53	38.34	.91	1
Heavy Equipment Operator	55B52	340	25.55	5.84	16
Lineman	55B73	38	40.19	.65	3
Millwright	55B95	89	19.52	1.53	1
Painter	55C12	178	3.99	3.06	3
Plumber &/or Pipefitter	55C30	340	13.62	10.67	23
Roofer	55C58	182	39.39	4.43	3
Sheet Metal Worker	55C81	258	39.61	.43	9
Taper	55D07	55	NA	.95	2
Ceiling Tile	55S06	33	48.94	.57	1
Electrician Helper	56005	55	23.93	.95	9
Roofer Helper	56011	55	NA	.95	1
Plumber Helper	56010	83	31.38	1.43	9
All Other Skilled Craftsmen	59001	38	NA	.65	1
All Other Operatives	59002	86	NA	1.48	4
All Other Laborers	59003	107	NA	1.84	9

SPECIAL TRADE CONTRACTOR'S INDUSTRY
(CONT.)

OCCUPATIONAL TITLE	OES CODE	ESTIMATED EMPLOYMENT	RELATIVE ERROR %	PERCENT DISTRIBUTION	PERCENT OF ESTABLISHMENTS REPORTING THE OCCUPATION
CLERICAL OCCUPATIONS		395			
Bookkeeper Hand	61307	76	*44.54*	*1.31*	*19*
General Clerk	61333	156	*35.58*	*2.68*	*35*
Payroll &/or Timekeeper	61351	42	*49.30*	*.72*	*16*
Secretary	61368	60	*45.31*	*1.03*	*23*
Stock Clerk, & Storeroom	62008	40	*47.21*	*.69*	*5*
SALES OCCUPATION		85			
Salesman	71000	80	*49.18*	*1.38*	*9*

OCCUPATIONS PRESENT IN THE SURVEY
BUT NOT PUBLISHABLE BECAUSE OF RELATIVE ERRORS
GREATER THAN FIFTY PERCENT OR LESS THAN 30 PEOPLE

Civil Engineer
Computer Programer
Craneman/Derrickman
Furnace Installer
Computer Operator
Sales Clerks
Mechanic Automotive
Shipping and Receiving Clerk
Engineering Equipment
Fine Grader Man
Asphalt-Plant Operator
Mechanical Engineer
Draftsman
Deliverymen and Routeman
Welders & Flamecutter
Receptionist
Electrical Engineer
Plasterer
Cabinet Maker
Concrete-Mixer Operator
Hook and Chainmen
Oiler
Asphalt Raker
Purchasing Agent
Mechanic Maintenance
Foreman Maintenance
Bookkeeping & Billing
Typist
Stone Mason Helper
Plasterer Helper
General Maintenance Man
Form Setter Metal Rd
Glazier
Asphalt-Plant Drier
Clerical Supervisor

TABLE 25

TOTAL WAGE AND SALARY EMPLOYMENT
IN THE CONSTRUCTION INDUSTRY

Year	General SIC 15	Heavy SIC 16	Special Trade SIC 17
1972	3800	3500	4100
1973	4500	4100	4500
1974	5200	5300	5000
1975	3700	3800	4600
1976	4600	3800	5100
1977	5700	4600	5300
1978	5500	4800	6000

All data are rounded to the nearest hundred.

TABLE 26

TOTAL CONSTRUCTION EMPLOYMENT
UNITED STATES
1960 - 1978

Year	Employment
1960	2,926,000
1961	2,859,000
1962	2,948,000
1963	3,010,000
1964	3,097,000
1965	3,232,000
1966	3,317,000
1967	3,248,000
1968	3,350,000
1969	3,575,000
1970	3,588,000
1971	3,704,000
1972	3,889,000
1973	4,097,000
1974	4,020,000
1975	3,525,000
1976	3,576,000
1977	3,833,000
1978	4,212,000

SOURCE: Employment and Earnings
February, 1979
U.S. Department of Labor, Bureau of Labor Statistics
Vol. 21, No. 2

TABLE 27

MONTANA HOURS AND EARNINGS
FOR THE CONSTRUCTION INDUSTRY

1970-1978

Year	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
1970	187.22	37.0	5.06
1971	201.85	37.8	5.34
1972	221.28	37.0	5.98
1973	233.45	36.8	6.34
1974	262.36	35.9	7.31
1975	271.10	34.1	7.95
1976	317.54	39.3	8.08
1977	379.64	37.7	10.07
1978	388.02	33.8	11.48

TABLE 28

NATIONAL HOURS AND EARNINGS
FOR THE CONSTRUCTION INDUSTRY

1970 - 1978

Year	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
1970	195.45	37.3	5.24
1971	211.67	37.2	5.69
1972	221.19	36.5	6.06
1973	235.89	36.8	6.41
1974	249.25	36.6	6.81
1975	266.08	36.4	7.31
1976	283.73	36.8	7.71
1977	295.65	36.5	8.10
1978	318.32	36.8	8.65

SOURCE: Employment and Earnings
October, 1979
U. S. Department of Labor
Bureau of Labor Statistics
Vol. 26, No. 10

APPENDIX

DEFINITION OF OES TERMS

Benchmark Employment: A term used to identify specific employment figures which existed at a particular point in time. In the OES survey program, the term benchmark is used in two ways: (1) It is the establishment or industry employment that existed at the time the sample was designed. (2) When estimates are made, it is used again to refer to the total universe employment for each estimating cell as of the reference date of the survey.

ES-202: A quarterly listing of employment and contributions of all firms covered under the unemployment insurance laws of Montana. From this lising, the Mining and Construction Industry sample was selected.

Establishment: An economic unit which produces goods or services, for example: a consulting service, a factory, or a store. In most instances, each establishment is a single physical location and is engaged in one predominant type of economic activity for which an industry code is applicable. Establishments are also referred to as reporting units.

Estimating Cell: One size class in one industry.

Sample Weight: A numberical value that is assigned to an establishment during the sample selection. For example: if an establishment has an occupational employment of 25 and a weight of four, then for estimating purposes, the 25 employment will have a representation of 100 (ie, 4x25).

Sampling Error: The difference between data obtained from a sample and data which would have been obtained if the same survey methods were applied to collecting identical information from the entire population.

Sampling Frame: The sampling units actually available to sample.

Sampling Units: The establishments selected randomly fro the universe.

Size Class: The stratification of an industry by employment. For example: establishments with employment of 10-19 would be in one size class, and those with employment of 20-49 would be in another size class, etc.

Standard Industrial Classification (SIC): A group of establishments primarily engaged in the same or similar line of economic activity. In the nonmanufacturing division, the line of activity is generally defined as any function that excludes Manufacturing, Wholesale and Retail Trade, Regulated Industries, and Government. Throughout this report, SIC's are correlated with a significant numerical designation. For example: SIC 10 is the Metal Mining Industry, SIC 17 is the Special Trades Contractors Industry.

Universe: Total amounts of establishments or units covered under the Montana Employment Security Law.

Usable Response: All receipts which, after initial classification and schedule review, are analyzed to produce useable OES data.

DEFINITIONS OF SELECTED OCCUPATIONS
IN THE CONSTRUCTION/MINING INDUSTRIES

ALL OTHER HELPERS TRADES: Include all other helpers who assist one or more workers in the skilled trades by performing a variety of duties such as furnishing materials, tools and supplies; cleaning work areas, machines and equipment; holding materials and tools; and performing other routine duties.

ALL OTHER SKILLED CRAFTSMEN: Include all other skilled craftsmen and kindred workers in construction (and other) occupations that require a thorough and comprehensive knowledge of processes involved in the work; the exercise of considerable independent judgment; usually a high degree of manual dexterity; and possibly responsibility for valuable equipment. They usually become qualifies by serving apprenticeships or by extensive training.

ALL OTHER OPERATIVES: Include all other operatives and semiskilled workers in construction (and other) occupations who are required to exercise manipulative ability limited to a fairly well-defined work routine; to be vigilant and alert to prevent damage to equipment; to exercise limited independent judgment. These occupations may require the performance to a limited extent of part of a craft or skilled occupation.

ALL OTHER LABORERS: Include all other laborers and unskilled workers in construction (and other) occupations that involve the performance of simple, easily learned duties, involving little independent judgment. These occupations usually do not require previous experience, but jamiliarity with the occupation is helpful. They vary from light to heavy physical work.

ASPHALT PLANT OPERATOR: Operates stationary or semiportable, power-driven plant that mixes ingredients, such as sand, stone and naphtha to produce asphalt paving material used in road construction.

BLASTER, MINING AND QUARRYING: Determines patterns of explosives required and charges, tamps, and sets off explosives in underground or surface mine, pit, or quarry to break and loosen ore, coal, or rock from solid formations.

BOILERMAKER: Constructs, assembles, maintains and repairs stationary steam boilers; follows blue-prints and uses hand and power tools. Assists in testing assembled vessels. Directs cleaning of boilers; inspects and repairs fittings, such as safety valves, regulators, water columns, etc.

BRATTICEMAN: Builds doors or brattices (ventilation walls or partitions) in underground passageways to control the proper circulation of air through the passageways and to the working places.

CARPENTER: (Exclude cabinet-maker, floorlayer except hardwood, lather, and drywall applicator.) Performs the carpentry duties necessary to make or repair wooden structures, structural members, and fixtures and equipment, using carpentry tools and wood-working machines.

CEMENT MASON: Finishes surfaces of freshly poured concrete walls, roads, walkways, and curbs to specified testures, using handtools, including floats, trowels, screeds.

COST ESTIMATOR: Prepares cost and work completion estimates for engineering contract bids. Computes cost estimates of raw materials, purchased equipment, or subcontracted work and labor.

CRANEMEN/DERRICKMEN AND HOISTMEN: Operate various kinds of cranes and hoists to lift, move, and load materials, machines, and products.

DISPATCHER, MINECAR: Controls or keeps track of the traffic on haulageways and informs underground workers by telephone or track signals when to move trains or locomotives.

DRAFTER: Prepares working plans and detail drawings from sketches or notes for engineering purposes, according to specifies dimensions. Utilizes knowledge of various machines, engineering practices, mathematics, building materials to complete drawings.

DREDGE OPERATOR: Operates power-driven dredge to mine sand and gravel at the bottom of lakes, rivers, and streams.

DRIER OPERATOR, COAL OR ORE: Controls one or more of several types of furnaces or kilns, and driers or auziliary equipment to dry coal or one before or after washing, milling, or pelletizing.

DRILLER, HAND: Drills holes in specified pattern and location in ore, earth, or rock to facilitate planting of explosives.

DRILLER, MACHINE: Sets up and operates deilling machine (truck mounted, etc.) to bore or burn out blasting holes. Includes workers who operate drilling equipment to obtain samples of strata for analysis of geological character of ground, nature of ore, strength of foundation material, etc.

DRY-WALL APPLICATOR: Applies plasterboard or other wallboard to ceiling and interior walls of buildings.

DUMP OPERATOR: Tends mechanical or electrical dumping equipment to dump materials, such as raw coal or ore, from mine cars, railroad cars, or trucks into bins or onto conveyor for storage, reloading, or further processing.

ENGINEER: Include persons concerned with practical application of physical laws and principles of engineering for the development and utilization of machines, materials, instruments, processes, and services. Count as engineers all persons actually engaged in chemical, civil, electrical, mechanical, metallurgical, or any other type of engineering work at a level which requires knowledge of engineering.

ENGINEERING EQUIPMENT MECHANIC: Analyzes malfunction and rebuilds, repairs, and adjusts heavy construction equipment other than internal combustion engines, such as cranes, power shovels, scrapers, paving machines, motor graders, rock crushers, trench-digging machines, conveyors, and bulldozers.

FITTER: Alines pipeline section preparatory to welding. Signals tractor driver in placing pipeline sections in proper alighment and inserts steel spacer.

FURNACE INSTALLER: Installs and repairs hot-air furnaces, stoves, and similar equipment in accordance with diagrams and other specifications, using handtools and pipe-threading tools.

GEOLOGISTS AND GEOPHYSICISTS: Geologist: Studies composition, structure, and history of the earth's crust. Examines rocks, minerals, and fossil remains to identify and determine sequence of processes affecting development of earth. Applies knowledge of chemistry, physics, biology, and mathematics to explain these phenomena and to help locate mineral and petroleum deposits and underground water resources. Geophysicist: Studies physical aspects of earth, including its atmosphere and hydrosphere. Investigates and measures seismic, gravitational, electrical, thermal, and magnetic forces affecting earth.

GLAZIER: Installs plass in windows, skylights, store fronts, and display cases, or on surfaces, such as building fronts, interior walls, ceilings, and tabletops.

HEAVY EQUIPMENT OPERATOR: Operates several types of power construction equipment, such as compressors, pumps, shovels, tractors, scrapers, or motor graders, to excavate, grade earth, pour concrete, etc.

LAMPMAN: Cleans, tests, repairs or otherwise maintains electric lamps and safety lamps used underground by miners.

LOADING MACHINE OPERATOR: (UNDERGROUND): Operates underground loading machine to load coal, ore, or rock into shuttle or mine car or onto conveyors. Loading equipment may include any of various types, such as power shovel, hoisting engine equipped with cable-drawn scraper or scoop, or machine equipped with gathering arms and conveyor.

LINEMAN: Strings and repairs cables or wires, installs insulators and erects poles or towers for telephone or electrical power transmission. May work in tunnels.

MACHINIST: Sets up and operates machine tools and fits and assembles parts to make or repair metal parts, mechanisms, tools or machines of an establishment applying knowledge of mechanics, shop mathematics, metal properties, and layout machining procedures.

METAL FABRICATOR: Fabricates and assembles structural metal products, such as framework or shells for machinery, ovens, tanks, stack, and metal parts for buildings and bridges according to job order or blue-prints.

MILL AND/OR GRINDER OPERATOR, MINERALS: Tends or operates equipment such as grinding mills and crushers that grind, pulverize, compress or otherwise reduce minerals (e.g., rock, ore, coal, salt, clay and glass) to smaller sizes.

MINE MACHINERY MECHANIC: Repairs, adjusts, and maintains mining machinery, such as stripping and loading shovels, drilling and cutting machines, continuous mining machines, and mine cars.

MOTORMAN, INDUSTRIAL: Controls dinkey engine powered by electric, gasoline, steam, compressed air, or diesel engine to transport and shunt cars at industrial establishment or mine.

OILER: Oils and greases moving parts of friction surfaces of mechanical equipment, such as shaft and moving bearings, sprockets, drive chains, gears, and pulleys, according to specified procedures and oral instructions.

PANELBOARD OPERATOR: Operates panelboard to control machinery and equipment such as conveyors, blenders, vibrating feeders, crushers, rod and ball mills, sizers, separators, washers, distributors, and pumps to grind, separate or otherwise prepare coal, rock, or ore for further processing or for commercial or industrial use.

PLASTERER: Applies coats of plaster to interior walls, ceilings, and partitions of buildings to produce finished surface, according to blue-prints, architect's drawings, or oral instructions.

PUMPMAN: Tends one or more power driven pumps to transfer liquids, semi-liquids, gaseous or powered materials from one vessel or process to another.

PURCHASING AGENT: Purchases machinery, equipment, tools, raw materials, parts, services, and supplies necessary for operation of an organization.

REFRIGERATION MECHANIC: Installs, services, and repairs refrigerating and cooling systems according to blue-prints and engineering specifications, using knowledge of refrigeration, structural layout, and function and design of components.

REINFORCING IRON WORKER: Positions and secures steel bars in concrete forms to reinforce concrete. Determines number, size, shapes, and locations of reinforcing rods from blue-prints, sketches or oral instructions.

REPAIRMAN, BELT: Repairs and replaces canvas, leather, or rubber belts used to drive machinery or convey materials.

ROTARY DRILL OPERATOR: Operates permanent or portable gasoline, diesel, electric or steam draw works to drill oil or gas wells. May also frill shallow boreholes to obtain samples of earth formations for placement of explosives in seismic prospecting, or to discover petroleum.

ROUSTABOUT: Assembles and repairs oilfield equipment, using handtools and power tools. Performs other tasks as needed.

SAWYER, STONE: Sets up and operates saws to cut blocks of stone into specified dimensions.

SEPARATION TENDER: Tends or operates one or more devices, such as jigs, cones, and battery of spirals, that separate impurities from coal, ore and other minerals.

SHAKER TENDER: Tends shaker (vibrating or reciprocating screen) that sizes crushed coal, ore, or rock for industrial use or for further processing.

STATIONARY BOILER, FIRER: Fires stationary boilers that supply heat, power, or steam to an establishment. May be required to hold license issued by State or municipality.

STATIONARY ENGINEER: Operates and maintains stationary engines and mechanical equipment, such as steam engines, air compressors, generators, motors, turbines, and steam boilers, to provide utilities, such as light, heat, or power for buildings, and industrial processes.

STRUCTURAL STEEL WORKER: Performs any combination of the following duties to raise, place, and unite girders, columns, and other structural-steel members to form completed structures or structural frameworks, working as member of a crew. Hoists and alines member, fastens member with bolts or rivets, or cuts or welds member to specifications.

TECHNICAL OPERATOR, OIL AND GAS: Charts pressure, temperature, and other characteristics of oil and gas well boreholes or producing wells, using special subsurface instruments, and interprets findings for use in determining further drilling or producing procedures.

TIPPLE OPERATOR: Operates engines or motors that drive conveyors, shaking screens, and other machinery in a tipple where coal or ore is prepared for market.

WELL PULLER: Controls power hoisting equipment to pull casing, tubing and pumping rods from oil and gas wells for repair and to lower repaired equipment, testing devices, and servicing tools into well.

METHODOLOGY

A. OES SAMPLE DESIGN

The sample used in the OES survey represented a number of firms selected from a universe consisting of all the construction and mining industry establishments covered under Montana's Unemployment Insurance Law. The sample selected from the universe was stratifies into six major industry groups: 1) Metal Mining, 2) Coal Mining, Non-Metal Mining and Quarrying, 3) Crude Petroleum and Natural Gas Extraction, 4) General Building Construction, 5) Heavy and Highway Construction, and 6) Special Trades Construction. Each stratum was then classified into nine cells based on employment levels by firm. The sampling traio was selected with respect to the employment totals in each size cell. For large size cells, which had fewer establishments, the proportionate sample ratio was smaller; for small size cells, which had more establishments, the proportionate sampling ratio was larger.

B. SURVEY CORRESPONDENCE

1. Interviews were conducted via mail and telephone. Each establishment selected in the sample received a detailed survey form. Each survey form listed questions concerning employment levels, job titles, and job descriptions. The various job descriptions were prepared by the Bureau of Labor Statistics and were tested by occupational analysis field centers of the Employment and Training Administration, assuring accurate classifications of job descriptions. Also, to assure occupational homogeneity, the surveyed firms were separated into six major groups within the construction and mining division. Further, to assure consistency in the data, establishments in the survey were asked to use the month of August, 1978 as the survey month.

2. The OES Construction and Mining Industry survey contained seven occupational categories:

    1) Managers and Officers

2) Professional Occupations
3) Technical Occupations
4) Service Occupations
5) Maintenance, Construction, Repair, Material Handling and Powerplant Occupations.
6) Clerical Occupations
7) Sales Occupations

3. Occupational Classification

The occupational classification system used in this OES program assumes a compromise classification between the 417 job titles from the Bureau of the Census and over 21,741 job titles from the Dictionary of Occupational Titles (DOT). By using both sources, this more flexible OES structure has the capability of taking advantage of some of the broad socio-economic characteristics of the Bureau of the Census and at the same time preserving the ability to provide DOT job definitions for Manpower training and Analysis. Various occupations have been classified in the "all other" residual categories, because 1) only minimal on-the-job training was required, or 2) these occupations did not have significant numbers of employees. However, great care was exercised to insure the availability of specific employment figures for occupations which require significant amounts of education and/or training.

4. Survey Processing and Screening

After data was collected, corrections were made, data was thoroughly screened, and final editing procedures were used to produce a "clean data file". The resulting clean data file is used to produce the occupational employment estimate for the major industry groups in the Construction and Mining Industry. The estimating process used ratio estimates and a series of weighting factors dependent upon the size cell of an establishment. For example, if the sampling ratio, or probability, of sample selection is one out of every five establishments, then the sample weight is five. This result is thus called the weighted reported occupational employment. The ratio for each size class is computed from summed weighted reported data and then this ratio is multiplied by the occupational employment as of the reference

date. Accurate and reliable computed ratios are extremely important for obtaining precise estimates for occupational staffing patterns. After the employment estimates are calculated for each of the size cells, the results are summed to produce occupational estimates for each industry.

5. Reliability and Accuracy of Occupational Employment Estimates

Precision of statistical data is an essential criteria for manpower education and training to successfully analyze these estimates. To optimize precision, the following types of errors must be minimized:

a) Non-sampling errors - these are errors that arise from faulty responses to survey questionnaires, physical errors in processing surveys, inaccurately furnished data, and inadequate planning and data collecting. Great care in obtaining a "clean data file" has minimized non-sampling errors in the construction and mining industry survey.

b) Sampling errors - these are errors that result from the difference between the sample data estimate and the entire population parameter, i.e. the construction and mining universe. This type of error is strictly due to sampling techniques.

c) Standard errors - these errors are the square root of the variances of the estimates, where the variance of an estimate is equal to the product of squared and weighted sample observations and a series of correction factors needed when sampling from a finite population.

d) Relative error* - these errors are an important tool in measuring the precision of an occupational employment estimate. Relative error expresses the standard error of an estimate as a percentage of that estimate, i.e. relative error times occupational employment estimate is equal to the standard error. More precisely, if there are 100 managers and officers in coal mining and relative error is 10 percent, then the standard error is simply 10. For example, assume we estimate a total of 300 managers and officers in all the size classes in the mining and construction industry, and the standard error is computed as 40. This error measures the precision about the estimate of 300 managers and officers. Applying the formula, the relative error, then, expressed as a percent, is simply: $\frac{40 \times 100}{300} = 13.33\%$, at one standard deviation.

That is, at one standard from the true construction and mining universe population of managers and officers, our estimate of 300 gives us a relative error of 13.33% at a level of confidence of 68%. Therefore, we can say that 68% of the time our estimate will be $300 \pm (.1667 \times 300)$, or between 260 and 340 managers and officers. Because of the fluctuation of the relative error from one occupational characteristic to another, an optimum sample design is virtually nonattainable.

6. Occupations With Less Than Thirty and/or Relative Error Greater Than 50%

In each SIC (Standard Industrial Classification), many more occupations were surveyed than are actually shown in the tables. Occupations which were surveyed had employment of less than 30 people and/or relative error greater than 50% were suppressed and merely categorized by OES code name at the end of each SIC major group.

* Only those specific occupations with a relative error 50% or less were put in the publication. All occupations with less than 30 people and/or a relative error greater than 50% were put in the residual categories. As such the relative error was not computed for the residual categories.

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OFFICIAL BUSINESS

The Montana State Employment Security Division maintains 24 local Job Service Offices in the principal cities of Montana. You are invited to call on any of these offices for assistance in filling positions in your organization, additional labor market information, and for other services in connection with your employment problems.

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